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## CAUSE OF THERMOTROPISM IN ROOTS.

Ackerson (Bot. Gaz. Sept. '14), experimenting with roots at temperatures 10° to 40° C., finds that the cells of the concave side of a root, which curves because of different temperatures on its opposite sides, are more permeable than those on the convex. Permeability to dissolved substances means less turgor, or shrinking. He believes, because of the complete parallelism, that the temperature changes cause variation in permeability; and variation in permeability results in curvature. Hence what we call thermotropism is not a direct tropism, but a turgor movement.

## TRUE HERMAPHRODITISM IN MAMMALS.

True hermaphroditism means the existence of ovaries and testes in the same individual, and is not a matter of external organs. Pick (Arch. Mikr. Anat. lxxxiv (1914) 2te. Abt. p. 119) makes an elaborate discussion of the subject of hermaphroditism in the mammals including man. The testicular or ovarian quality of the glands can be determined even tho they may not produce functional sex cells. Eleven cases are known in hogs and three in man in which both germinal organs are found in an individual. Both glands may occur on each side, or the testis may be on one side and the ovary on the other.

## WHAT IS THE NATURE OF HAIR?

Botezat (Anat. Anzeig xlvii, 1914) holds that the hairs of mammals are distinctive structures and are not homologous with any of the various epidermal vertebrate structures to which they have been likened. They have been homologized with fish scales of various kinds, teeth, skin sense organs of amphibians and reptiles, and have even been considered as mere specialized portions of the epidermis itself. The author feels that they probably arose as tactile structures, and their protective function is a derived one.

## SUPPRESSION OF MOULTING IN BIRDS.

Beebe (Zoologica, i, 1914; p. 253) gives an interesting account of the effects of keeping birds from breeding in the spring and summer and, as autumn comes, keeping them quiet, in somewhat darkened cages, and with increased food. Tanagers so treated kept

their scarlet and black feathers thru the winter. When brought into the normal spring condition they moulted these and they were replaced at once by others of the same color with no trace of the winter plumage which normally intervened. The writer believes that the thinness or fatness of the birds brought on by difference in nutrition and exhaustion determines the presence or absence of moulting. He secured a moult in midwinter by one of the tanagers by a suitable change. In this case the power to produce the green winter color was shown not to be lost in those that do not moult at all; but merely suppressed because there were no new feathers being formed at the time.

#### THE GERM-CELL CYCLE IN ANIMALS.

The term "Germ-cell Cycle" is a recognition of the fact that there is in each species a definite history whereby the germ cell of one generation is derived from a germ cell of the preceding. We have been in the habit of thinking of a cycle involving germ cells, embryo, mature body, and then more germ cells. Weismann's conception of a continuous germ plasm, from whose activity bodies spring up in what we call successive generations, has focused our attention rather upon the germ cells as furnishing the real cycle.

We have for some time known many of the points in the history of the germ cells during the stages of their maturing and union to form a new embryo. The tracing of their behavior into the new body which is formed about them is a more difficult task,—one only recently attacked with success.

The steps in this germ cell cycle are summarized by Professor Hegner as follows:

1. Fertilization or union of two germ cells to form an embryo of one cell containing the possibilities of continued germ cells and of the body that is to protect them.
2. The segmentation of this fertilized ovum and the putting aside of one or more primordial germ cells.
3. The early multiplication of these primordial germ cells.
4. A period of rest from growth and division, on the part of the germ cells, while the growth of the embryonic body is taking place. During this time the germ cells may separate into two groups and migrate to the points where the ovaries or testes are to be located.